UNITED STATES PATENT AND TRADEMARK OFFICE

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10/584,290	06/04/2007	Leif Axelsson	4660-8	4095

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EXAMINER
SARWAR, BABAR

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>03</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>*13 July 2009*</u>.
2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45 and 48-55* is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-45 and 48-55* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a)☐ All   b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☒ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

Response to Arguments

1.   Applicant's arguments with respect to **claims 1-45, 48-55** have been considered

but are moot in view of the new ground(s) of rejection.

2.   **Claims 1, 17, 31, 45, 48** have been amended.

3.   **Claims 46-47** have been cancelled.

4.   **Claims 49-55** are newly added claims.

Claim Rejections - 35 USC § 112

5.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 51-55 are rejected under 35 U.S.C. 112, first paragraph, as failing to

comply with the written description requirement. The claim(s) contains subject matter

which was not described in the specification in such a way as to reasonably convey to

one skilled in the relevant art that the inventor(s), at the time the application was filed,

had possession of the claimed invention.

The newly added **claims 51-55** recite limitations **"select higher quality links for**

the determined route path irrespective of whether the selected higher quality

links are the most energy efficient links" which are not recited or stated anywhere in

the submitted specification. Thus the claim contains new matter. However, the

specification does disclose "The link status monitor 102 may also receive information

from an application layer or the hardware of the node that is relevant in a route

determination process. Such information may be, for example, battery level or energy

status of nodes in the network in order to exclude such nodes in the routing path or at

least reduce the amount of usage of such nodes" as disclosed in **Para 0091**.

Claim Objections

6.   **Claim 55** is objected to because it depends on **claim 46** which has been

cancelled.

        Appropriate correction is required.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

8.   **Claims 1-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over**

Robert A. Kennedy (US 6,763,014 B1) in view of Redi et al. (US 2002/0071395 A1),

hereinafter referenced as Kennedy and Redi.

        Consider **claims 1, 17, 31, 45, 48-50**, Kennedy discloses a system for efficient

routing in a multiple hop wireless communication network comprising a plurality of

infrastructure nodes **(Abstract, Fig. 1, where Kennedy discloses an Ah Hoc wireless**

communication network), the system comprising: link monitoring circuitry for acquiring

link quality information indicating link status between said infrastructure nodes

(Abstract, Col. 3:8-23, Fig. 2, where Kennedy discloses determining a Node/Group

condition based on link quality, link failure, and link creation, therefore acquiring

link quality information indicating link status); electronic processing circuitry for using said link quality information in a route path determination process in the infrastructure nodes using a predictive procedure **(Abstract, Col. 5:64-67, Col. 6:1-12, Fig. 2, where Kennedy discloses storing node condition information to predict route stability, therefore using said link quality information in a route path determination process)**; said link quality information containing information about a time varying information of said link status **(Abstract, Col. 3:8-23, Col. 6:25-28, Col. 6:35-38, Fig. 2, where Kennedy discloses determining a Node/Group condition based on link quality, link failure, and link creation, node/group movement, therefore time varying information of said link status)**; and said predictive procedure uses said time varying information of link status in the predictive procedure **(Abstract, Col. 5:64-67, Col. 6:1-12, where Kennedy discloses building and updating routing tables, therefore using said time varying information of link status in the predictive procedure)**; and a router for routing data packets according to a determined route path **(Abstract, Col. 5:64-67, Col. 6:1-12, Fig. 2, where Kennedy discloses storing node condition information to predict route stability, therefore routing data packets according to a determined route path)**.

Kennedy does not explicitly disclose a link monitoring circuitry and an electronic processing circuitry. Redi discloses a link monitoring circuitry and an electronic processing circuitry **(Para 0017, where Redi discloses a CPU, an electronic processor circuit and an electronic memory circuit)**.

Therefore it would have been obvious to one of ordinary skill in the art at the time

the invention was made to modify Kennedy with the teachings of Redi so as to

improvise by building and updating routing tables based on link conditions with respect

to the changing nature of the Ad Hoc networks as discussed in **Para 0068**.

Consider **claim 2**, the combination teaches everything claimed as implemented

above (see claim 1). In addition, Redi discloses that said wireless communication is a

transmission system based on electromagnetic radiation with a frequency in the range

of 100 kHz to 100 PHz **(Para 0062, where Redi discloses the transmission**

frequency).

Consider **claim 3**, the combination teaches everything claimed as implemented

above (see claim 2). In addition, Kennedy discloses that said transmission system is

one or several of IEEE 802.11, IEEE 802.15, IEEE 802.16, HiperLAN, HomeRF,

Bluetooth, IR, UWB, JTRS, 3G, GPRS, or EDGE **(Col. 1:15-26, Fig. 1, where Kennedy**

discloses the cellular and the Ad Hoc networks).

Consider **claim 4**, the combination teaches everything claimed as implemented

above (see claim 1). In addition, Kennedy discloses a reactive ad hoc routing protocol

(Col. 5:57-63, Fig. 2, where Kennedy discloses routing protocols).

Consider **claim 5**, the combination teaches everything claimed as implemented

above (see claim 1). In addition, Kennedy discloses a proactive ad hoc routing protocol

(Col. 5:57-63, Fig. 2, where Kennedy discloses routing protocols).

Consider **claim 6**, the combination teaches everything claimed as implemented

above (see claim 1). In addition, Kennedy a combination of reactive and proactive ad

hoc routing protocols **(Col. 5:57-63, Fig. 2, where Kennedy discloses routing protocols)**.

Consider **claim 7**, the combination teaches everything claimed as implemented above (see claim 1). In addition, Kennedy discloses that said link status information is radio channel status information given by measurement of at least one of Doppler spread, coherence time, average fading duration, signal strength, or signal to interference noise ratio **(Abstract, Col. 3:8-23, Col. 6:25-28, Col. 6:35-38, Fig. 2, where Kennedy discloses determining a Node/Group condition based on link quality, link failure, and link creation, node/group movement i.e. velocity)**.

Consider **claim 8**, the combination teaches everything claimed as implemented above (see claim 1). In addition, Kennedy discloses that said predictive procedure for an ad hoc routing protocol uses obtained link status information and a radio channel information in a comparison with determined routing anticipation criteria **(Abstract, Col. 5:64-67, Col. 6:1-12, Fig. 2, where Kennedy discloses storing node condition information to predict route stability)**.

Consider **claim 9**, the combination teaches everything claimed as implemented above (see claim 4). In addition, Kennedy discloses that said predictive model for said reactive ad hoc routing protocol obtains information about link status and a radio channel status from modified RREP, Hello messages, Acknowledgements, or RERR messages **(Abstract, where Kennedy discloses transmitting beacons)**.

Consider **claim 10**, the combination teaches everything claimed as implemented above (see claim 5). In addition, Kennedy discloses that said predictive model for said

proactive ad hoc routing protocol comprises a modified routing table containing a route status field with information about a link status **(Abstract, Col. 5:64-67, Col. 6:1-12, where Kennedy discloses building and updating routing tables)**.

Consider **claim 11**, the combination teaches everything claimed as implemented above (see claim 1). In addition, Redi discloses that said link status information comprises energy status of nodes in the network **(Para 0017, where Redi discloses determining path loss by evaluating power data corresponding to a message received from the first node, therefore link status information comprises energy status of nodes)**.

Consider **claim 12**, the combination teaches everything claimed as implemented above (see claim 1). In addition, Kennedy discloses that said link status information comprises number of NACK or ACK signals between nodes in the network **(Col. 5:57-63, Fig. 2, where Kennedy discloses routing protocols)**.

Consider **claim 13**, the combination teaches everything claimed as implemented above (see claim 1). In addition, Kennedy discloses that said link status information comprises number of bit errors in a communication between nodes in the network **(Abstract, Col. 6:35-38, Fig. 2, where Kennedy discloses bit/packet error rates)**.

Consider **claim 14**, the combination teaches everything claimed as implemented above (see claim 1). In addition, Kennedy discloses that said link status information comprises information about ownership of nodes in the network **(Abstract, Fig. 1, where Kennedy discloses an Ad Hoc network)**.

Consider **claim 15**, the combination teaches everything claimed as implemented

above (see claim 1). In addition, Kennedy discloses a routing protocol used in a system according to claim 1 **(Abstract, Col. 5:64-67, Col. 6:1-12, where Kennedy discloses building and updating routing tables)**.

Consider **claim 16**, the combination teaches everything claimed as implemented above (see claim 15). In addition, Kennedy discloses the routing protocol being one of a proactive ad hoc routing protocol, reactive ad hoc routing protocol, or a combination of a proactive and reactive ad hoc routing protocol **(Col. 5:57-63, Fig. 2, where Kennedy discloses routing protocols)**.

Claim 18, as analyzed with respect to the limitations as discussed in claim 4.

Claim 19, as analyzed with respect to the limitations as discussed in claim 5.

Claim 20, as analyzed with respect to the limitations as discussed in claim 6.

Claim 21, as analyzed with respect to the limitations as discussed in claim 7.

Claim 22, as analyzed with respect to the limitations as discussed in claim 8.

Claim 23, as analyzed with respect to the limitations as discussed in claim 9.

Claim 24, as analyzed with respect to the limitations as discussed in claim 10.

Claim 25, as analyzed with respect to the limitations as discussed in claim 11.

Claim 26, as analyzed with respect to the limitations as discussed in claim 12.

Claim 27, as analyzed with respect to the limitations as discussed in claim 13.

Claim 28, as analyzed with respect to the limitations as discussed in claim 14.

Claim 29, as analyzed with respect to the limitations as discussed in claim 2.

Claim 30, as analyzed with respect to the limitations as discussed in claim 3.

Claim 32, as analyzed with respect to the limitations as discussed in claim 2.

Claim 33, as analyzed with respect to the limitations as discussed in claim 3.

Claim 34, as analyzed with respect to the limitations as discussed in claim 4.

Claim 35, as analyzed with respect to the limitations as discussed in claim 5.

Claim 36, as analyzed with respect to the limitations as discussed in claim 6.

Claim 37, as analyzed with respect to the limitations as discussed in claim 7.

Claim 38, as analyzed with respect to the limitations as discussed in claim 8.

Claim 39, as analyzed with respect to the limitations as discussed in claim 9.

Claim 40, as analyzed with respect to the limitations as discussed in claim 10.

Claim 41, as analyzed with respect to the limitations as discussed in claim 11.

Claim 42, as analyzed with respect to the limitations as discussed in claim 12.

Claim 43, as analyzed with respect to the limitations as discussed in claim 13.

Claim 44, as analyzed with respect to the limitations as discussed in claim 14.

Consider **claim 51**, the combination teaches everything claimed as implemented above (see claim 1). In addition, Kennedy discloses wherein the electronic processing circuitry is configured for to use said link quality information in a route path determination process to select higher quality links for the determined route path irrespective of whether the selected higher quality links are the most energy efficient links **(Abstract, Col. 5:64-67, Col. 6:1-12, Fig. 2, where Kennedy discloses storing node condition information to predict route stability)**.

Claims 52-55, as analyzed with respect to the limitations as discussed in claim 51.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BABAR SARWAR whose telephone number is (571)270-5584. The examiner can normally be reached on MONDAY TO FRIDAY 09:00 A.M -05:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NICK CORSARO can be reached on (571)272-7876. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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